

**REMARKS**

Claims 1-50 are pending in this application, claims 1-12, 35 and 39 having been withdrawn from consideration. By this Amendment, claim 33 is amended; and new claims 41-50 are added. Support for the amendments to claim 33 can be found in the specification as originally filed, for example at paragraph [0040]; in claim 33 as originally filed. Support for new claims 41-50 can be found in the specification as originally filed, for example, at paragraphs [0010], [0037], [0038], and [0040]. No new matter is added by these amendments.

**I. Election of Species Requirement**

A telephone requirement for restriction/election of species was made in connection with the above-identified patent application on April 10, 2006. Specifically, Applicants were required to elect between Species I, fuel cells having a solid polymer membrane, identified by the Examiner as reading on claims 1-12, 35 and 39, and Species II, fuel cells having a solid oxide membrane, identified by the Examiner as reading on claims 13-34, 36-38 and 40.

Applicants affirm that, in response to that telephone requirement, a provisional election was made on April 14 to prosecute Species II, fuel cells having a solid oxide membrane, claims 13-34, 36-38 and 40. Accordingly, claims 1-12, 35 and 39 are withdrawn from consideration. Applicants respectfully traverse the Requirement.

Applicants respectfully submit that the elected Species reads on at least claims 1, 3-7, 9-40, with claims 1, 3-7, 9-18, 23-28, 30, 33-36, 39 and 40 being generic. Thus, Applicants respectfully submit that claims 1, 3-7, 9-12, 35 and 39 should be rejoined and examined with claims 13-34, 36-38 and 40.

Applicants also respectfully submit that the subject matter of both identified Species is sufficiently related that a thorough search for the subject matter of any one Species would encompass a search for the remaining Species. Thus, it is respectfully submitted that the

search and examination of the entire application could be made without serious burden. *See* MPEP §803 ("if the search and examination of an entire application can be made without serious burden, the examiner must examine it on the merits, even though it includes claims to independent or distinct inventions" (emphasis added)). It is respectfully submitted that this policy should apply in the present application in order to avoid unnecessary delay and expense to Applicants and duplicative examination by the Patent Office.

Thus, withdrawal of the Restriction Requirement and rejoinder of all claims are respectfully requested.

## **II. Rejection Under 35 U.S.C. §112**

The Office Action rejects claim 33 under 35 U.S.C. §112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as the invention. While Applicants do not necessarily agree with this rejection, claim 33 is amended herein to more clearly set forth the claimed subject matter. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

## **III. Rejection Under 35 U.S.C. §102**

The Office Action rejects claims 13-15, 18 and 36 under 35 U.S.C. §102(b) over Japanese Patent Application Publication No. 07-185277 to Edlund. Applicants respectfully traverse this rejection.

Independent claim 13 sets forth an "electrolyte membrane for a fuel cell, comprising: a substrate formed from a dense hydrogen permeable material; and an inorganic electrolyte layer formed on at least one side of the substrate." Claims 14, 15 and 18 depend, directly or indirectly, from claim 13 and incorporate all of the limitations thereof. Independent claim 36 sets forth a "method of manufacturing an electrolyte membrane for a fuel cell, comprising the steps of: preparing a substrate formed from a dense hydrogen permeable material; and forming an inorganic electrolyte layer on at least one side of the substrate."

Edlund teaches a composite metal membrane for selectively separating hydrogen from other gases. *See* Edlund, Abstract. Specifically, Edlund teaches a membrane including a vanadium substrate, niobium oxide layers formed on both sides of the substrate, and palladium layers formed on the niobium oxide layers. *See* Edlund, [0045]. Based on these teachings, the Office Action takes the position that the pending claims are anticipated by Edlund. Applicants respectfully disagree.

In Edlund, the niobium oxide layers do not function as electrolyte layers, and these layers cannot function as electrolyte layers in a fuel cell. If the Edlund niobium oxide layers were used as electrolyte layers in a fuel cell, the niobium oxide would be reduced to niobium metal, causing a short-circuit in the fuel cell and preventing power generation. Thus, the membrane disclosed by Edlund is not appropriate for use in a fuel cell. Therefore, Edlund does not disclose the claimed electrolyte membrane for a fuel cell or method of manufacturing an electrolyte membrane for a fuel cell.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

#### **IV. Claim Rejections Under 35 U.S.C. §103**

The Office Action rejects, under 35 U.S.C. §103(a), claims 16 and 17 over Edlund in view of U.S. Patent No. 5,759,712 to Hockaday; claims 19 and 20 over Edlund in view of U.S. Patent Application Publication No. 2003/0044667 to Hara et al.; claims 21 and 37 over Edlund in view of U.S. Patent No. 6,521,202 to Vaughey et al.; and claims 22 and 38 over Edlund in view of U.S. Patent No. 6,521,202 to Vaughey et al. In addition, the Office Action rejects, under 35 U.S.C. §103(a), claims 23-25, 28-30, 34 and 40 over Hara in view of Edlund; claims 26 and 27 over Hara in view of Edlund and Hockaday; claim 31 over Hara in view of Edlund and Vaughey; and claim 32 over Hara in view of Edlund and Vaughey. Because these rejections are related, Applicants respectfully traverse these rejections together.

Independent claims 13 and 36 are set forth above. Claims 16, 17 and 19-22 depend, directly or indirectly, from claim 13 and incorporate all of the limitations thereof. Claims 37 and 38 depend from claim 36 and incorporate all of the limitations thereof.

Independent claim 23 sets forth a “fuel cell, comprising: an electrolyte membrane having a substrate formed from a dense hydrogen permeable material and an inorganic electrolyte layer formed on at least one side of the substrate; an oxygen electrode disposed on one side of the electrolyte membrane; an oxidizing gas supply portion that supplies an oxidizing gas to the oxygen electrode; a hydrogen electrode disposed on the other side of the electrolyte membrane; and a fuel gas supply portion that supplies a hydrogen-rich fuel gas to the hydrogen electrode.” Claims 24-32 and 34 depend, directly or indirectly, from claim 23 and incorporate all of the limitations thereof. Independent claim 40 sets forth a “method of manufacturing a fuel cell comprising the steps of: forming an electrolyte membrane by forming a substrate formed from a dense hydrogen permeable material, and forming an inorganic electrolyte layer on at least one side of the substrate; arranging an oxygen electrode and an oxidizing gas supply portion that supplies an oxidizing gas to the oxygen electrode on one side of the electrolyte membrane; and arranging a hydrogen electrode and a fuel gas supply portion that supplies a hydrogen-rich fuel gas to the hydrogen electrode on the other side of the electrolyte membrane.”

As discussed above, Edlund does not teach, nor does it suggest, an electrolyte membrane for a fuel cell that comprises a “substrate formed from a dense hydrogen permeable material; and an inorganic electrolyte layer formed on at least one side of the substrate,” as set forth in claim 13, or a method of manufacturing such an electrolyte membrane, as set forth in claim 36. For the same reasons as discussed above, Edlund does not teach or suggest a fuel cell comprising such a membrane or a method of manufacturing

such a membrane. Thus, Edlund alone cannot support rejections of independent claims 13, 23, 36 and 40.

However, combining Edlund with the Hockaday, Hara and/or Vaughey references does not remedy the shortcomings of Edlund, because none of the cited references teach or suggest an electrolyte membrane for a fuel cell that comprises a “substrate formed from a dense hydrogen permeable material; and an inorganic electrolyte layer formed on at least one side of the substrate,” as set forth in claims 13 and 36 and as formed in the manufacturing methods of claims 23 and 40. The Office Action admits that Hara does not teach or suggest an electrolyte membrane including an electrolyte layer as set forth in the pending claims. *See* Office Action, page 6, item 11. The Hockaday and Vaughey references are cited as teaching features of dependent claims, but neither reference teaches or suggests an electrolyte membrane as set forth in the claims. *See generally* Hockaday, Vaughey.

For at least the above reasons, claims 16, 17, 19-32, 34, 37, 38 are patentable over Edlund, Hockaday, Hara and Vaughey, individually and in combination. Accordingly, reconsideration and withdrawal of the rejections are respectfully requested.

**V. New Claims**

By this Amendment, new claims 41-50 are added. Claims 41, 42 and 49 depend, directly or indirectly, from independent claim 13 and include all of the limitations thereof. Claims 43 and 44 depend, directly or indirectly, from independent claim 23 and include all of the limitations thereof. Claims 45, 46 and 50 depend, directly or indirectly, from independent claim 36 and include all of the limitations thereof. Claims 47 and 48 depend, directly or indirectly, from independent claim 40 and include all of the limitations thereof. Applicants respectfully submit that, for at least the same reasons set forth above with respect to claims 13, 23, 36 and 40, claims 41-50 are patentable over the cited references.

**VI. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-50 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff  
Registration No. 27,075

Julie M. Lake  
Registration No. 51,156

JAO:JML/jml

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**OLIFF & BERRIDGE, PLC**  
**P.O. Box 19928**  
**Alexandria, Virginia 22320**  
**Telephone: (703) 836-6400**

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